



Vulnerability



ORD/Regional Cumulative Risk
Assessment Workshop

November 7, 2002

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Invulnerable?



Definitions

- **Vulnerable – open to being wounded, as with a weapon, criticism, etc.**



Application...

- A Vulnerable subpopulation may be hurt by an insult where the general population would either not be hurt, or the damage would be substantially less, by the same insult.
- This may be because of inherent sensitivity, because they're already stressed, because they're unprepared, or because they can't get over it

Vulnerability

- Susceptibility/Sensitivity
- Differential exposure
- Differential preparedness
- Differential ability to recover

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Who Does Vulnerability Assessments?

- Population vulnerability to famine
- Computer Systems
- Banks
- Hospitals
- Ecological Assessments
- Correctional Facilities
- Etc.

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Definitions

- **Susceptible – especially liable to being affected by something**
 - **Sensitive – highly responsive to certain agents**
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Susceptibility/Sensitivity

- A susceptible or sensitive individual or subpopulation is one where equal exposures or stressor insults result in **substantially higher incidence or severity** of effects than those usually seen in the general population
- Not usually within normal variability in a population

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Does one size fit all?



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Susceptibility/Sensitivity

- Biological causes
- May have different dose-response
- May be at a particular life stage, such as infancy, pregnancy
- May have become sensitized
- Prior exposure may have caused damage

Differential Exposure

- Differences in position on dose-response curve can mean different response to equal exposure insult
- Previous exposure, reflected in body burden, etc.
- Different background exposures

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Result of “Background” Exposure



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Yet Another Definition:

**Vulnerability =
exposure to threat + inability to cope**



Coping with Famine

- Households can often cope to some extent with the effects of a crisis



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Household Famine Coping Mechanisms

- Draw-down on household stocks and assets
- Transfers from family members working in other areas
- Reduced food consumption
- Wild/less preferred foods
- Assistance from community/religious support mechanisms
- Government safety net programs

Coping with Famine, continued

- Coping mechanisms effectively seek to augment resources
- Households often diversify consumption
- Exposure to multiple risks, or risks of high frequency, duration, and intensity, often undermine the capacity of households to cope with future crises
- If unchecked, recurrent crises can lead to a downward spiral of vulnerability

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What does “Coping” have to do with Risk?

- **Inability to cope changes risk**
- **For example, Chester, PA breast cancer statistics**

Differential Preparedness

- Hurricane preparedness
- Influenza shots
- Regular health checkups
- General health of ecosystem or person

Differential Recovery

- Disease states
- Compromised immune system
- Lack of access to health care

Vulnerability Analysis

- Much precedent, especially ecological
- Who are we protecting?
- Inferences from health data
- May be difficult, qualitative
- May meet resistance